

ABSTRACT

- Methods, apparatuses and systems for producing powder particles of extremely small, highly uniform spherical shape and high sphericity, composed of
- 5 metal including single metals and alloys, including nanocomposite structures, using a self-assembling procedure. The invention further includes the produced spherical particles. The metal spherical particles are produced whereby molten metal, alloys or composites are directed onto a fast-rotating disk in an atmosphere containing one or more inert gases and small amounts of an oxidizing gas and the molten
- 10 metal drops are dispersed as tiny droplets for a predetermined time using centrifugal force within a cooling-reaction gas, and then cooled rapidly to form solid spherical particles. The spherical particles comprise a crystalline, amorphous or porous composition, having a size of 1-300  $\mu\text{m}\pm1\%$  with a uniformity of size being  $\leq60\text{-}70\%$  and a precise spherical shape of less than or equal to  $\pm10\%$ .
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